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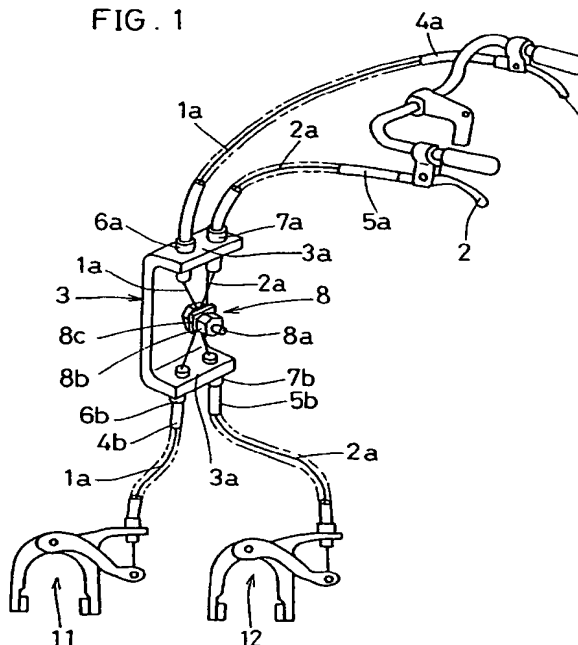
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54 **Braking device for a cycle.**

57 A braking device for bicycle provided with two wire brake systems is described. There is provided a relay (3) amid outer tubes (4a,4b,5a,5b) of both brakes and to which divided ends of the outer tubes are connected. Both continuous brake wires (1a,2a) are fixed together inside the relay after individual adjustment. It is then possible to actuate the two brake systems simultaneously by manipulation of either brake lever (1,2) and adjustment of the device is feasible with ease for it can be done independently for each system before fixing of both wires.

FIG. 1



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The present invention relates to improvement of a braking device for a cycle wherein two braking systems can be actuated simultaneously by manipulation of a single brake lever.

As prior art for simultaneous braking device for bicycle there are known, among others, Japanese Patent Publication No. 55 (1980)-22312 and No. 3 (1991)-23394. With each thereof two independent lines of brake wires are divided amid into four parts in total and each end thereof is connected to a movable plate.

Hitherto, it has been taken as preferable to have braking of the front wheel effected later than that of the rear wheel. In the aforementioned prior arts attempts were made for delaying braking of the front wheel such as providing a backlash for the connection between the wire and the movable plate. For that, however, it was necessary to first adjust either brake before adjusting the other brake with its stroke matched, this resulting in decrease of the wire's effective stroke. And this gave rise to a problem that it was then difficult to adjust the gap between the wheel and the brake shoe to be correct for both wheels. Such adjustment was extremely difficult when there were such factors as loosening of the connection with the moving plate, tolerances in the dimensions of the parts involved, deformation of the wheels et cetera, these possibly resulting in failure of braking or of a release thereof. Worse, with the wire divided into four, there resulted an increase of the number of the parts involved as well as of the man-hours required for assembly and also a relative increase in size of the movable plate which affected the aesthetic quality thereof.

It is an object of the present invention to solve such problems about the prior art, that is, to provide a braking device with which adjustment of the gap between the wheel and the brake shoe is facilitated.

In accordance with the present invention, a braking device is provided comprising a pair of brake levers for respective braking mechanisms each having a brake wire led from its brake lever through an outer tube to respective brakes and, when either brake lever is manipulated, the two brakes are actuated jointly.

Preferably, in such a braking device there is provided an outer tube relay intermediate the length of the outer tubes for both brakes, divided ends of the outer tubes being connected thereto and a fixing means secures together two brake wires leading from each brake lever to each brake inside the outer tube relay. The construction allows independent adjustment of each wire brake system before fixing together both brake wires, hence an effective displacement can be ensured for each brake wire and each brake can be actuated without fail. Since the size of the outer tube relay need only be sufficient for securing together the brake wires, there is no problem of it being so bulky as to be visually obtrusive. Also, such a brak-

ing device can be easily arranged to be attached to a bicycle already in use.

A preferred embodiment of the invention will now be described with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view showing an embodiment of the present invention;

Fig. 2 is a perspective view of an outer tube relay of the embodiment in a different shape; and

Fig. 3 is a perspective view of a fixing means used in the embodiment.

In Fig. 1 reference numeral 1 designates a brake lever for a front wheel brake, 1a a brake wire, 11 a brake for the front wheel, 2 a brake lever for a rear wheel brake, 2a another brake wire, 12 a brake for the rear wheel, the brake lever 1 and the brake 11 being connected by the wire 1a and the brake lever 2 and the brake 12 being connected by the wire 2a.

Reference numeral 3 designates an outer tube relay, 4a and 4b outer tubes through which a wire 1a passes and 5a, 5b outer tubes through which a wire 2a passes. The outer tube relay 3 is a rectangular plate with both ends portions thereof bent at right angles, and the outer tubes 4a, 4b, 5a and 5b are connected to the bent portion 3a of the outer tube relay 3 via the outer tube receivers 6a, 6b, 7a and 7b connected to the relay 3 respectively. The relay 3 is, therefore, a means for connecting the outer tubes 4a and 4b on the one hand and the outer tubes 5a and 5b on the other, and the wires 1a and 1b are set to pass through the inside of this relay 3.

The outer tube relay 3 may as well be a lidless box-like one with its continuous side wall 3c around a bottom 3b as shown in Fig. 2. This alternative has an advantage of being higher in strength compared with that of Fig. 1. Reference numeral 3d designates each one connecting hole for the outer tube.

Reference numeral 8 designates a fixing means for fixing the wires 1a and 2a together inside the relay 3. As shown in Fig. 3(a), it is made up of a bolt 8a, a nut 8b and a pressing plate 8c having a rectangular hole therein and the bolt 8a has formed inward of its head a boss whose sectional shape is corresponding to that of the hole in the pressing plate 8c and this boss that a through hole 8d in the diametric direction. The wires 1a and 2a are to be set through this hole 8d before screwing up the nut 8b so that the wires 1a and 2a are fixed securely. The construction described above is a mere example and it is also possible to use a fixing means of different construction such as shown in Fig. 3(b) the bolt 8a has not boss and the wires 1a and 2a are set outward shaft and a nut 8b is screwed up to have the wires 1a and 2a fixed together between the head 8e and the pressing plate 8c.

Fixing of the wires 1a and 2a by the use of the fixing means 8 is done after connecting the wires 1a and 2a between the brake lever 1 and the brake 11 or the brake lever 2 and the brake 12 respectively and sub-

sequent adjustment of the wire length et cetera. Since the adjustment can then be done independently, the brakes for the front and rear wheels can be adjusted optimally without affecting that of the brake for the other wheel and the work therefor is easy.

With the brake of the construction as described above when, for example, the brake lever 1 is manipulated, the wire 1a is pulled and the brake 11 is actuated. Since, however, the wires 1a and 2a are fixed together inside the relay 3, the wire 2a is pulled beyond thereof and the brake 12 is actuated, too. The same applies when the brake lever 2 is manipulated. Since the brakes 11 and 12 for both wheels are thus linked, both front and rear wheels are braked simultaneously, safely and quickly, even when only either brake lever is manipulable.

Then, the actuating conditions of the front and rear wheels depend on the independent adjustment done before fixing of the wires, and proper actuation of the brakes is feasible. If fixing of the wires by means of the fixing means 8 should be erroneous, the consequence is only failure to attain simultaneous braking, this not interfering with the individual function of the brakes, and safety is thus ensured.

Further advantages of the illustrated construction are that requires relatively few parts and can be quickly assembled.

It will be understood that the braking device described is also applicable to tricycles, for example, and the term "bicycle" as used in the specification and claims should therefore be interpreted to include all cycles with two or more wheels.

Claims

1. A braking device for a cycle provided with a plurality of wire brake systems in each of which the brake wire is led from a brake lever through an outer tube to a respective brake, and so arranged that when one or other of the brake levers is manipulated, all the brake systems are actuated, the device comprising:
 - an outer tube relay inserted intermediate said outer tubes for the respective brake systems and the divided ends of each said outer tube being connected thereto, and
 - means for fixing together inside said outer tube relay each said brake wire.
2. A braking device according to claim 1, wherein there are two said brake systems operable on the front and rear wheels respectively of the cycle.
3. A braking device according to claim 1 or claim 2, wherein said outer tube relay is a rectangular plate with opposite end portions bent over.
4. A braking device according to claim 1 or claim 2, wherein said outer tube relay is box-shaped having a side wall extending substantially continuously around a bottom wall.
5. A braking device according to any one of the preceding claims, wherein said fixing means has formed therein a transverse aperture in which said brake wires are located and clamped.
6. A braking device according to any one of claims 1 to 4, wherein said fixing means comprises a pair of mutually threaded elements having opposed end faces between which said wires are clamped by tightening the threaded connection between the elements.
7. A braking device for bicycle provided with two wire brake systems in which each brake wire is led from a brake lever through an outer tube to a brake respectively, and arranged so that when either of the brake levers is manipulated, two brakes are actuated simultaneously, the device comprising:
 - an outer tube relay inserted amid said outer tubes for each brake system and each divided end of said outer tubes is connected thereto, and
 - a fixing means for fixing together said each continuous brake wire leading from said brake lever to the brake inside said outer tube relay.

FIG. 1

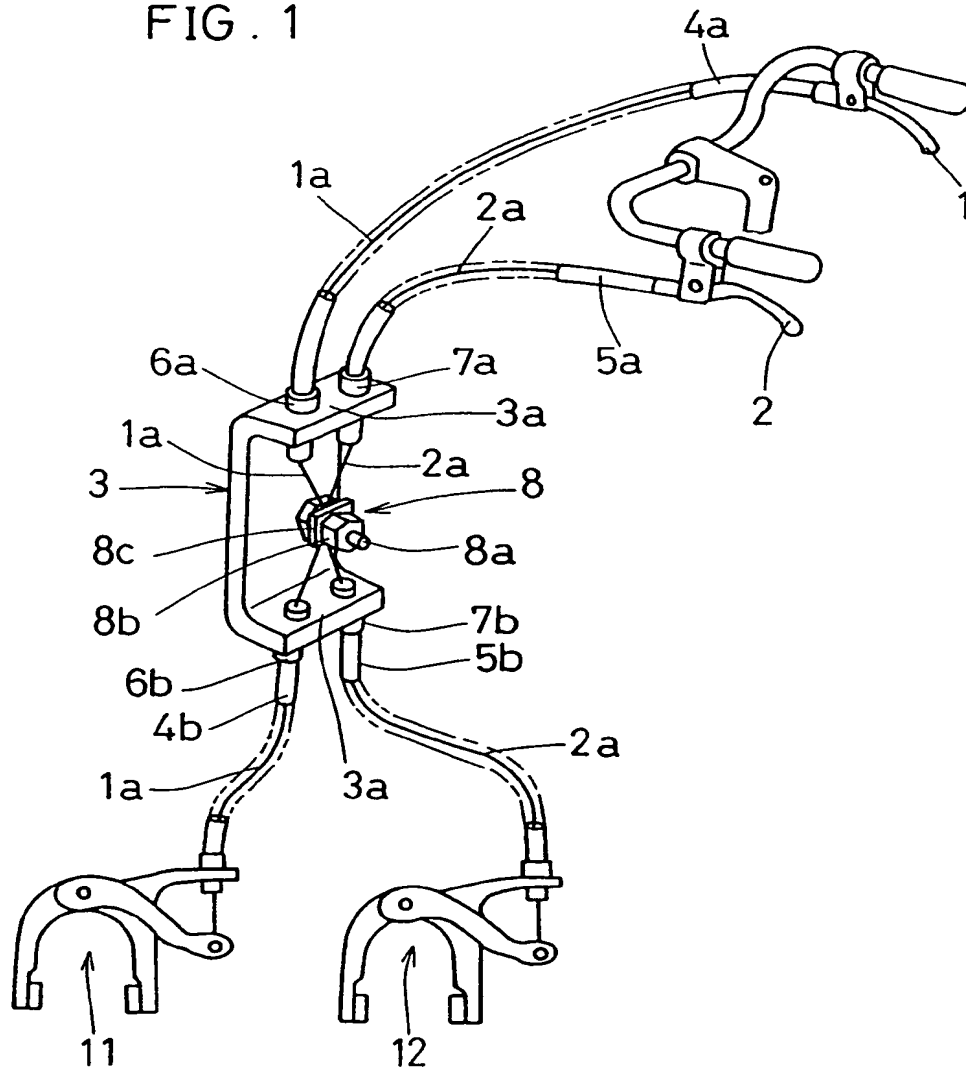


FIG. 2

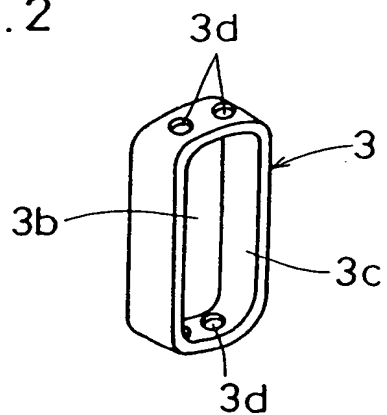
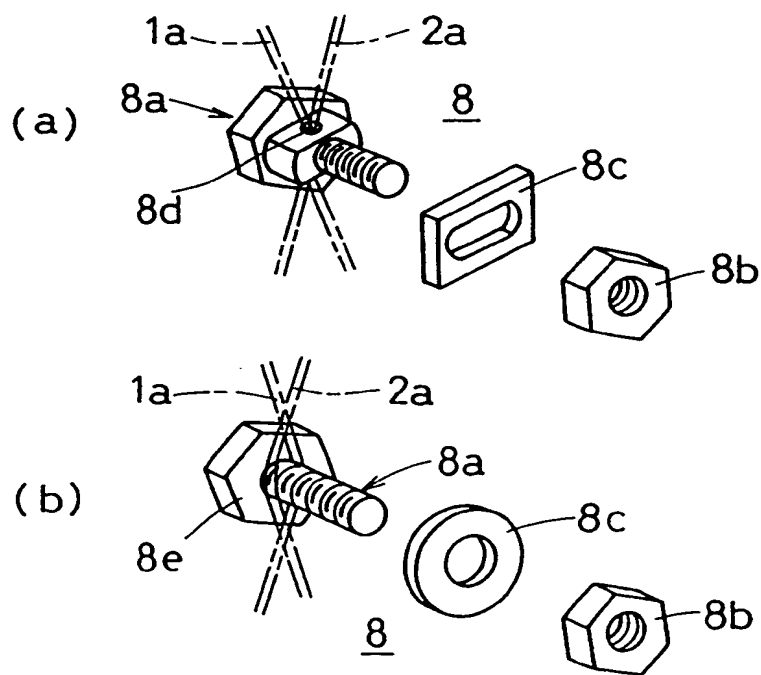


FIG. 3



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